

Things to Know, Understand and Do For Chapter 12: Chemical Kinetics

Know how to and/or understand...
Derive average and instantaneous rates from experimental data
Relate rate of appearance with rate of disappearance using stoichiometry.
Describe factors that affect reaction rate (<i>i.e.</i> reactant concentration, temperature, presence of catalyst and the state of reactants).
Define the various parts of the rate law equation (rate constant and order of reaction) and understand their significance.
Use experimental data to determine the rate law, determine the order of the reaction, and to define proper units for the constant.
Compare and contrast zero, first, and second order reactions in terms of the plot needed to give a straight line while plotting the integrated rate equation, the relationship of the rate constant to the slope of the straight line, and the half-life of the reaction.
Use the concept of half-life ($t_{1/2}$), especially for first-order reactions.
Describe the collision theory of reaction rates and use it to describe the effect of reaction concentration, presence of catalyst and temperature on reaction rate.
Understand reaction coordinate diagrams.
Describe the functioning of a catalyst and its effect on the activation energy and reaction mechanism; distinguish between a homogeneous and a heterogeneous catalyst..
Solve problems involving activation energy and the Arrhenius equation.
Understand the concept of reaction mechanism (the sequence of bond making and bond-breaking during the conversion of reactants to products) and the relation of the mechanism to the overall reaction stoichiometry and experimentally determined rate law equation.
Describe the elementary steps in a mechanism and give their molecularity.
Define the rate-determining step in a mechanism and identify any reactive intermediates.

Chapter 12 Homework

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